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International English

by

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My name is Ileana Buican. I work as a writer-editor at Los Alamos National Laboratory in the United States. The work I'm about to present is the result of a collective effort. We started less than a year ago at the incentive of Susan Dressel, the leader of the writing and editing group at Los Alamos. Inspired by many of her own ideas on International English, we have formed a committee and endeavored to produce guidelines for a version of English to be used by technical experts who attend international meetings. Our guidelines are young. They still await the test of various applications. The seven members of the Committee for International English who have contributed to the workshop are... (Viewgraph 1). I have put the workshop together.

As early as 1667, the historian of the Royal Society of London insisted on reforming the English language. In his words, members on the committee appointed to improve the use of the vernacular for scientific papers were striving

(Viewgraph 2)

to reject all of the amplifications, digressions and swellings of style: to return back to the primitive purity, and shortness, when men delivered so many things, almost in an equal number of words. They have exacted from all members a close, naked, natural way of speaking: positive expressions; clear sentences; a native easiness; bringing all things as near the mathematical plainness as they can; and preferring the language of Artizans, Countrymen, and Merchants, before that of Wits and Scholars.¹

[Thomas Sprat, History of the Royal Society, quoted by Herman M. Weisman in Basic Technical Writing, third Edition (Bell & Howell Publishing Co., Columbus, Ohio, 1974)].

And over three centuries later, we still find ourselves urging scientists to strive for plainness, clarity, conciseness, and accuracy of style in their writings. Our problem, today, is that the sheer number of scientific discoveries has made it nearly impossible for scientists to "deliver so many things almost in an equal number of words." Complicated, convoluted sentences and long, unpronounceable words often characterize our technical documents. Native speakers of English understand such documents with difficulty. No wonder then that foreign readers find them incomprehensible.

At a time when opportunities for international cooperation are opening up as never before, at a time when boundaries between West and East in Europe are beginning to be less clearly marked, technical communicators need to bring urgency to their search for techniques that make documents in English easy to read and understand. Why English? Some people may legitimately ask that question.

As Prof. C.L. Wrenn (once President of the British Philological Society) pointed out, "the English language is spoken or read by the largest number of people in the world, for historical, political and economic reasons."² [C.L. Wrenn, The English Language (Methuen & Co. Ltd., London, 1966)]. Indeed, at international scientific meetings, most papers are presented in English.

Our operations at Los Alamos National Laboratory involve international technology transfer and active scientific participation in international meetings. Thus, they demand clarity and accuracy of communication.

In the spirit of the 90s and in answer to the needs at Los Alamos National Laboratory, we have developed guidelines for writing scientific and technical documents in International English, a version of English that helps technical experts communicate across language barriers. However, we do not aim at eliminating the need for translation. Instead, we believe that, when translation is necessary, International English makes it easier and more cost-effective than standard technical writing in English does.

For some time now, people in organizations that operate worldwide have come to the conclusion that control of the range of vocabulary and of grammatical structures in English is beneficial to all readers and particularly to foreign readers. That is why large international companies--the Caterpillar Tractor Company, I.M. Ericsson, IBM, and Eastman

Kodak--have developed their own versions of "controlled" English. The idea was not really new. In 1932, Charles K. Ogden developed the first Basic English system² and later edited a Basic English Dictionary of 20,000 words. Basic English consists of a core of 850 words deemed indispensable for international communication. The claim is that Basic English can be used in translating any book or paper so that anybody interested in reading that information can understand it. For a while, people were most enthusiastic about the prospect of avoiding the vastness of English vocabulary while still being able to communicate. In China, for example, Basic English was apparently experimented with successfully, and in England it received considerable attention during the Second World War.² However, the system gradually fell into oblivion. Some of its critics believe that this happened because Basic English "is a scientific selection and no natural growth."²

Much later, the idea of Basic English was adopted by the Caterpillar Tractor Co. in Illinois. Because the company sells heavy-duty equipment throughout the world, it needs maintenance and repair manuals that foreigners can easily understand. Of course, the company could have resorted to translations, but translations are usually expensive, particularly when done into many different languages.

Caterpillar Fundamental English, accompanied by its own dictionary published in 1972, was the answer to such problems. It is a controlled version of English that restricts vocabulary to 784 words plus a list of names for special parts of the Caterpillar equipment. Synonyms are discouraged, each word may have only one meaning, verbs--particularly irregular ones--are to be kept to a minimum, sentences are short, but repetitions are encouraged. Of course, the non-English speaking audience for whom this language is meant cannot just pick up a document, read it, and instantly understand it. However, after a mandatory training period, foreign readers can use Caterpillar documents efficiently. The company has found that 30 to 60 hours of training are normally sufficient.³ [John Kirkman, Good Style for Scientific and Engineering Writing (Pitman Publishing Ltd., London, 1980)].

Simplified English is another form of "controlled" English. In 1986, l'Association Europeenne des Constructeurs de Materiel Aerospacial together with the Aerospace Industries Association of America developed AECMA Simplified English, a Guide for the Preparation of Aircraft Maintenance Documentation in the International Aerospace Maintenance Language. Simplified English, as presented in this guide, is meant for worldwide use in the aerospace industry.

(Viewgraphs 3a and 3b--Tables)

When looking at some of the variants of "simplified" or "controlled" English, we notice that each

is meant for a very specific audience that is clearly defined,

restricts vocabulary according to the particular needs of the audience, and

restricts grammatical structures.

Unlike Caterpillar English, Ericsson English, and Simplified English, which are primarily used in instructions or maintenance manuals meant for people with a low level of literacy, International English is meant for technical experts--scientists and engineers--who wish to communicate with colleagues from all over the world. This international audience understands technical terminology easily but is likely to experience problems with idioms, jargon, acronyms, abbreviations, initials, overmodified nouns, clustered sentences, unusual word order, awkward usage of negatives, and unclear or incorrect punctuation.

By considering our audience carefully, we understood that International English cannot benefit from restrictions of the general and technical English vocabulary **in the manner prescribed by Caterpillar English or Simplified English.** Our reasons for reaching this conclusion are different from those of critics such as Vicky Hearne⁴ ("Controlled English and Poetic Common Sense," in Language Technology, Vol. 9, 17-20, September-October 1989), who are against any attempt at restricting language. English philologists point out that two of the most appealing and, at the same time, challenging aspects of the English language are its formidable wealth and heterogeneousness of vocabulary. Along its development, English has avidly borrowed words from many different languages. In fact, it is conceivable that receptiveness to new elements has made English an attractive language in various parts of the world.² To deprive English of its natural richness, the argument goes, is equal to creating a contrived, artificial language that does not allow growth. However, these critics fail to consider the audience for whom the different versions of "controlled" English are meant: people with limited education who have an urgent need to understand a certain piece of equipment and use it properly and safely. Under such circumstances, richness of language ceases to be an important consideration.

International English does not deprive the English language of its vastness of vocabulary, but it starts from the premise that people can model language for their own purposes. We do not think that our guidelines are exhaustive. So far, we have approached the following main areas

(Viewgraph 4).

Considering our audience, namely, technical experts from all over the world, we recommend the following specific guidelines for vocabulary:

(Viewgraph 5)

1. Avoid idioms.

Idioms are created by "assigning a new meaning to a group of words which already have their own meaning." (A Dictionary of American Idioms) All languages have idiomatic expressions, but American English seems to abound in them. Speakers of American English use idioms frequently and naturally not only in speech but also in writing. However, the meaning of idioms is rather volatile; it can vary with individual speakers and regionally. It is not at all unusual to come across an example of technical writing that uses idiomatic expressions that are understood in different ways even by native speakers themselves. A sentence such as

(Viewgraph 6)

To all intents and purposes, numerical modeling in science and engineering involves a small number of basic steps...

raised a few eyebrows when I tested it on a number of scientists. **To all intents and purposes** is, of course, a filler phrase, one of those phrases we use when we cannot think clearly, but it is also an idiom. What does it mean? It can mean "apparently," "as far as we can tell," "in fact," or "in most ways." Which one of these meanings is the reader or listener supposed to choose? Our point is that the use of idiomatic expressions is conducive to **vagueness** of meaning, a feature that should be avoided in any writing and particularly in technical writing. In his essay "Politics and the English Language," George Orwell refers to the "mixture of vagueness and sheer incompetence" as the

most marked characteristic of modern English prose... As soon as certain topics are raised, the concrete melts into the abstract and no one seems able to think of turns of

speech that are not hackneyed; prose consists less and less of words chosen for the sake of their meaning, and more and more of phrases tacked together like the sections of a prefabricated hen-house.⁵

[George Orwell, "Politics and the English Language" in The Dolphin Reader (Houghton Mifflin Co., Boston, Massachusetts, 1986)]

To communicate with an international audience, technical experts need to avoid ready-made idioms that lead to vagueness of meaning and, therefore, to misunderstandings. Let us look at some more examples:

(Viewgraph 7)

The conventional-boiler cost information was obtained from **rule-of-thumb** estimates supplied by...

Most of the native English speakers I asked to define **rule of thumb** in this context told me that the phrase meant "standard" or "norm." In fact, **rule of thumb** implies a result obtained by guesswork based on experience. **Empirical** may have been a more accurate substitute. This sentence comes from a paper that was subsequently translated into Spanish. It is interesting to notice that the Spanish translator left out the troublesome idiom.

Some verbs followed by obligatory prepositions are idiomatic. Because they cannot be understood from the meanings of the individual constituent parts, International English needs to replace them by simple verbs.

(Viewgraph 8)

put up with = tolerate

have to do with = involve

(Viewgraph 9)

2. Do not use the same technical term to name two or more different concepts.

Technical words used in two or more senses within the same document are another source of confusion for an international audience.

(Viewgraph 10)

In the pacemaker industry, for example, the entire lead, that is, the wire that connects the pacemaker to the heart, is referred to by many specialists as the **electrode** (A). However, the same term, **electrode**, is also applied to the end of the lead that conducts electrical impulses to cardiac tissue (B). Moreover, the word **connector** is often used for both a part of the pacemaker (C) and a part of the lead (D). As a result, a sentence such as

(Viewgraph 11)

Lubricate the entire outer portion of the **connector**

is difficult to interpret. What must we lubricate? Is it C or D?

Because it is confusing to have the same term define two different parts of a piece of equipment, the translation coordinator for these pacemaker documents rewrote parts of the original text by observing International English guidelines. She called the whole wire **lead** and only its stimulating end **electrode**. Then, she left the word **connector** for the **lead** and used the term **lead receptacle** for the pacemaker because, as she found out, that was precisely the function of that part. Only afterwards could she proceed with the translation. Indeed, considerable time and money could have been saved had the original text been written in International English.

(Viewgraph 12)

3. Avoid using as part of your general vocabulary a term that has a technical meaning different from its general meaning.

It may be confusing, at least at first sight, to read

(Viewgraph 13)

Current physical characterization and testing of high-temperature superconducting (HTS) devices include routine measurements of resistance versus critical **current** density.

The first **current** is a general word, an adjective that means **present**. The second **current**, however, is a technical term, a noun meaning **electrical current**. Because of possible lack of clarity, we recommend that writers of International English replace the general word with a synonym.

(Viewgraph 14)

4. Avoid useless jargon. (A pretentious or unnecessarily obscure and esoteric terminology; language vague in meaning and full of circumlocutions and long high-sounding words.)

Each profession has, undoubtedly, its own jargon, its set of technical terms that may not necessarily be understood by people outside the respective profession. Because scientific and technical discoveries are born with such speed, technical people permanently coin new terms to reflect new ideas. Therefore, the use of technical jargon is unavoidable in technical documents. For example, in a document coming from the computer industry, we may encounter a sentence such as

(Viewgraph 15)

A **bug** in the program delayed our research considerably.

A **bug** in a computer program is, of course, an error that makes the program run incorrectly. Nobody in the computer industry will refer to that type of error by using a term other than **bug**.

(Viewgraph 16)

Figure 2 shows that water content increases dramatically for **water activity** above 0.8.

Chemists will know that **water activity** is a shorthand for the chemical potential of water, but a scientist from a different field may not be familiar with the jargon.

Although such words may be preserved in a document written in International English because they truly reflect what is happening in a certain profession, we recommend that their meanings be defined in a Glossary of Terms. What we need to guard against, however, is useless jargon, which appears in technical documents often. Let us consider the following example:

(Viewgraph 17)

...we start the solution at the first boundary and then continue it at the second boundary by **stepwise** integration of the partial differential equations.

The troublesome word in the example is **stepwise**, which could be translated as **step by step** or, better still for International English, **methodical**. Recent creations, such as **stepwise**, **timewise**, or **schedulewise**, are examples of

useless jargon and need to be eliminated from technical documents.

The next sentence

(Viewgraph 18)

Due to incompetence, the machine **was rendered inoperative**

could have easily been written as

The machine **broke** because the users were incompetent.

However, **broke** may have sounded too common, too banal a word to be used. It stood no chance in competition with **was rendered inoperative** that added extra weight to the sentence by virtue of its extra syllables. In technical documents, we often encounter such worthless phrases, which have too often come to replace simple and sound verbs. Not to mention the dangling **due to incompetence**, which should not have referred to the machine but to the persons who use it.

And, finally,

(Viewgraph 19)

After **prioritizing** the tasks to be completed, principal investigators estimated costs.

Prioritize and **utilize** seem to have completely replaced **to rank** and **to use**.

(Jewelry that ideally **accessorizes** today's fashions.)

The habit of turning nouns into verbs is yet another source of useless jargon in technical documents.

(Viewgraph 20)

The heat pipe was **vacuum degassed** by **furnace heating** at a temperature of 1175 K

and

The payload has been successfully **ground tested** by NASA contractors

are two cases in point. The offending verbs are **to vacuum degas**, **to furnace heat**, and **to ground test**. They make for

odd and ugly diction. The meaning of the two sentences could have been so much clearer had the author written

(Viewgraph 21)

The heat pipe was degassed by vacuum in a furnace at 1175 K;

and

NASA contractors have successfully tested the payload on the ground.

To sum up, there is a category of useful jargon that we do not need to avoid but we need to define for our international audience, and there is also useless jargon that International English should avoid.

Show cartoon.

(Viewgraph 22)

When undefined and used excessively, acronyms, abbreviations, and initials make us laugh because they seem absurd or irritate us because they mystify us.

(Viewgraph 23)

5. Avoid acronyms, abbreviations, and initials.

I can remember my own frustration when reading

(Viewgraph 24)

We also plan to help **BCTP** explore the use of video in the **TOC** to reinforce **O/C** observation of events.

(BCTP = Battle Command Training Program; TOC = Tactical Operations Center; O/C = Observer/Controller)

Although frequently used as shorthand, acronyms, abbreviations, and initials can impede communication for native and foreign English-speaking people alike. Our advice is--avoid such shorthand as much as possible. However, if you have to use acronyms, initials, or abbreviations, define them in a Glossary of Terms. All acronyms are pronounceable, as words are, but there are some acronyms that have become words through frequent usage. For example, it is probable that few of the people asked what

radar stands for will remember that the word is, in fact, an acronym for

(Viewgraph 25)

radio detecting and ranging.

The same holds true for **scuba**, an acronym for

self-contained underwater breathing apparatus

or for **laser**, an acronym for

light amplification by stimulated emission of radiation.

Acronyms such as **radar**, **scuba**, or **laser**, which are used in all languages as words, will not have to be defined, but their case is special. Most people would be surprised to hear that those words are acronyms. Other acronyms, abbreviations, and initials need to be defined in the text, upon first usage, and in the companion Glossary of Terms.

Initialism is a shorthand created by writing the initial letters of a phrase. The result is not pronounceable as a word.

The following sentence,

(Viewgraph 26)

Eight companies responded to an **RFP**, and their proposals are now under review,

should have been written as

Eight companies responded to a request for proposal (RFP), and their proposals are now under review.

(Viewgraph 27)

6. Avoid wrong diction.

This is, indeed, a requirement for all good writing. However, technical writing meant for an international audience should pay special attention to this guideline. If native speakers may deduce the meaning of a sentence that contains diction errors from the context in which the

sentence appears, nonnative speakers of English will be confused by such errors.

(Viewgraph 28)

The unsanitary water **is compounded** by reports of mass fish asphyxiation **fouling** the shoreline.

Water cannot be compounded...certainly not by reports. And asphyxiation is a way of dying. It cannot foul anything.

(Viewgraph 29)

I **poised** this question to a number of people and got responses **veering** from ...

The correct verbs are to pose or ask a question and to vary or range from...to.

(Viewgraph 30)

7. Avoid wordiness.

One of the outstanding features of English is its relative lack of inflexion--relationships among words in a sentence are indicated with only minimal changes in the appearance of words. However, such relationships have to be indicated somehow. That is why English, much more than other European languages, is prone to periphrases, which are roundabout ways of expressing ideas. It seems to us that this is at least one of the reasons for so much wordiness in poor-quality technical writing in English.

Let us consider the following examples:

(Viewgraph 31)

We developed a simple method of detection of those ions which shows promise as a method to be used to develop an instrument suitable for the detection of the presence of the alpha emitter without actually measuring the alphas directly.

(Viewgraph 32)

(We developed a simple method for ion detection. It may be used in developing an instrument that will detect the presence of the alpha emitter without measuring the alphas directly.)

Periphrases, circumlocutions, and expletive constructions--**there is** or **there are**--or phrases such as **it is necessary to** are all conducive to wordiness.

(Viewgraph 33)

There will be a need subsequent to contract award for an independent team of software specialists to perform tests on the system scheduled for delivery.

(Viewgraph 34)

(After contract award, an independent team of software specialists will test the system scheduled for delivery.)

Finally, smothered verbs (stifle under the weight of a long string of words) create wordiness and ambiguity. Avoid them.

(Viewgraph 35--cartoon)

(Viewgraph 36)

The values **are found to be in agreement.**

(The values agree.)

(Viewgraph 37)

We decided to **undertake an examination of...**

(We decided to examine...)

(Viewgraph 38)

The values **are accounted for by the fact that...**

(The values are due to...)

Moving from vocabulary in general to the more specific topic of nouns, we need to stop and consider overmodified nouns, which constitute one of the most troublesome problems of technical writing for an international audience. Our guideline is

(Viewgraph 39)

8. Avoid overmodified nouns.

Lack of inflexions in English makes it difficult for the reader or listener to understand the relationships among a string of nouns and adjectives that modify one noun.

The writer of the next sentence avoids hyphens and is in favor of compressed ways of expressing abundant information. As it turns out though, this tendency leads to another kind of wordiness...

(Viewgraph 40)

As part of this work, **flexible metal foil heat pipe radiator elements** have been built and tested with **liquid metal working fluids**.

In the first highlighted phrase, the **function** of the heat pipes (**heat pipes for radiator elements**) is combined with the **composition** of the heat pipes (**metal foil**), all in one breath; **flexible** describes the metal foil. In the second part of the sentence, **liquid metal working fluids** modifies the compound verb "have been built and tested." Instead, it should modify only "have been tested." **Liquid metal** describes the **type of working fluids** used in the testing of those particular heat pipes..

(Viewgraph 41)

(We have built heat pipes for radiator elements. They are made of flexible metal foil and have been tested with liquid metals used as working fluids.)

The phrase

(Viewgraph 42)

... a rare-earth-doped, cold-cast, high energy, silicate laser glass

gives too much information in a compressed form. The result is lack of clarity because the function, method of fabrication, and composition of the glass are all lumped in one big group. We need to look at the phrase for a while to understand that **rare-earth-doped** and **silicate** describe the composition of the glass, **cold-cast** defines the method of fabrication, **laser** shows what the glass is used for, and **high-energy** refers to the type of laser. Then we can rewrite the phrase as

(Viewgraph 43)

... a rare-earth-doped, silicate glass used in high-energy lasers. The glass is cold cast.

The meaning of a sentence can radically be affected by the use or lack of use of definite and indefinite articles. Accurate usage of such articles is indispensable if an

international audience is expected to understand the intended meaning correctly. Our rule, therefore, is

(Viewgraph 44)

9. Use articles correctly.

(Viewgraph 45)

Little change in the measured values indicates that the lead is well anchored in the ventricle.

The implication is that **any** change in values should be **negligible** and there may actually be **no** change.

If we introduce the indefinite article

(Viewgraph 46)

A little change in the measured values indicates that the lead is well anchored in the ventricle,

the meaning of the sentence will be different, in fact, essentially opposite. The sentence implies that there **should** be some change if the lead is well anchored.

Another specific area of vocabulary includes verbs. Considering our international audience, we decided that guidelines for usage of verbs in International English will address voice, modal verbs, tenses, as well as negatives and positives.

(Viewgraph 47)

10. Use the active voice **whenever you can**.

Technical editors lament the abuses of the passive voice in technical documents. Of course, excessive use of the passive is related to the tradition of scientific objectivity. Scientists are taught that technical papers need to be factual, impersonal, objective. What better way, the argument goes, than to express your statements in the passive.

It is always hard to convince scientists or engineers to change passive constructions into active ones although, clearly, the passive breeds lifeless expression. We have to acknowledge, however, that in certain situations--for

example, when the action performed by the subject of the active sentence is the focus of the sentence--the passive is the right solution in a sentence.

(Viewgraph 48)

Passive:

Equal parts of the two chemicals **were diluted** in water as the experiment proceeded.

Active:

My colleagues **diluted** equal parts of the two chemicals in water as the experiment proceeded.

Most often though, scientists fill their documents with passive constructions, which they use for no better reason than their unwillingness to express information directly.

(Viewgraph 49)

Passive:

Where that is the case, **use** of one of the two methods described in Section 5 **is required**.

Active:

In this case, **use** one of the two methods described in Section 5.

(Viewgraph 50)

11. Use a minimum of modal verbs (may, might, can, could, shall, should, will, would).

Defective modal verbs (called defective because they lack certain tenses and moods) are a significant chapter in English grammar. At the same time, they are difficult for second-language speakers to master. Modal verbs express the speakers' or writers' attitude toward the content of their sentences. Differences among them are often shades of meaning and therefore extremely hard for an international audience to grasp. Our advice is, omit modal verbs if the basic meaning of the sentence is unaffected by the change.

(Viewgraph 51)

The requirement for fluid mass flow **can be satisfied** with an artery/slab combination for

the fluid distribution system.

(Viewgraph 52)

An artery/slab combination for the fluid distribution system **satisfies** the requirement for fluid mass flow.

(Viewgraph 53)

12. Use simple tenses as much as possible.

(Viewgraph 54)

The evaporator **will have** a cross-section configuration. This **will allow** for a smoother transition from the rigid evaporator to the flexible radiator.

(Viewgraph 55)

A cross-section configuration for the evaporator **allows** a smoother transition from the rigid evaporator to the flexible radiator.

However, in scientific papers, it is often impossible to abide closely by the simple-tense restriction. Usually, the complexity of the matter presented is such that compound tenses are unavoidable. In that case, our advice is

(Viewgraph 56)

13. Use correct tenses to express the relation of one action to another in time.

(Viewgraph 57)

Incorrect:

The reaction **occurred** much faster in the second and third experiments, leading us to conclude that we **did not use** enough heat in the first one.

(Viewgraph 58)

Correct:

The reaction **occurred** much faster in the second and third experiments, leading us to conclude that we **had not used** enough heat in the first one.

(Viewgraph 59)

14. When different time frames are represented, do not omit necessary verbs or auxiliaries.

(Viewgraph 60)

Incorrect:

The computer **never has** and **never can be used** for such work.

(Viewgraph 61)

Correct:

The computer **never has been** and **never can be used** for such work.

(Viewgraph 62)

Incorrect:

They never **have** and never **will prove** the validity of their data.

(Viewgraph 63)

Correct:

They never **have proved** and never **will prove** the validity of their data.

Unannounced switching from negative to positive (or vice versa) creates lack of clarity.

(Viewgraph 64)

16. Avoid unannounced switching from negative to positive (or vice versa).

(Viewgraph 65)

Incorrect:

To be cost-effective, blast shields must not cost too much, require replacement or refurbishing too often, be too difficult or take too long to replace, and, of course, provide effective protection.

(Viewgraph 66)

Correct:

To be cost-effective...and, of course, they must provide effective protection.

This requirement holds true for good writing in general, but it must be strictly observed with an international audience.

Good writing style in English calls for variation in sentence length. Controlled or simplified versions of English advocate the use of only short sentences in an attempt to make the information clear to an audience with a low level of literacy. In International English, we use both long and short sentences. However, we have a word of caution: be sure that long sentences are not compound/complex. Our rule, therefore, is

(Viewgraph 67)

17. Vary sentence structure and length but make sure that long sentences are not compound/complex. (i.e., two or more main clauses and one or more subordinate clauses)

(Viewgraph 68)

All these gases are inert and do not present any hazards, but if they are used in small, unventilated areas that are accessible to personnel, the gases could be asphyxiant hazards.

(Viewgraph 69)

Rewrite:

All these gases are inert and thus present no hazards. However, they can cause asphyxiation if you use them in small, unventilated areas.

We can make long sentences readable in different ways as well.

(Viewgraph 70)

18. Use correct punctuation and lists to make a long sentence readable.

(Viewgraph 71)

Original:

We have unique experience and capabilities in several of the key technologies for the Human Genome Initiative including: discovery and characterization of specific repetitive sequences in human DNA, flow cytometry for sorting chromosomes and single molecule detection; the organization of databases

(GenBank) and computer analysis of nucleic acid sequences.

What's wrong:

This is the first sentence of the document. As such, it is extremely long and complicated, containing too much information. Structurally, it is a simple sentence.

The attempt to punctuate the list is not successful.

What can be done:

Break down the sentence into two sentences. First sentence states the main topic (We have experience and capabilities) and the second sentence adds detail to the first one by listing the capabilities.

Punctuate list correctly.

(Viewgraph 72)

Rewrite:

We have capabilities in several of the principal technologies that the Human Genome Initiative needs. These capabilities include

- (a) discovering and characterizing specific repetitive sequences in human DNA;
- (b) using flow cytometry to sort chromosomes and to detect single molecules;
- (c) organizing databases (such as GenBank); and
- (d) using computers to analyze nucleic acid sequences.

Because of the loss of inflexions in English, word order tends to be relatively fixed. Without changes in the form of words, relationships among words may prove to be ambiguous. A fixed word order serves, therefore, as a marker for proper relationships among words; it helps clarify meaning.

(Viewgraph 73)

19. Follow the rules of correct word order in English. When two or more correct arrangements are possible, use the order that will lead to the least ambiguity.

(Viewgraph 74)

Original:

A fire in any zone signals the fire control panel, which then sends the concentrator a signal.

Rewrite:

A fire in any zone signals the fire control panel, which then sends a signal to the concentrator.

(Viewgraph 75)

Everyone was glad when the computer broke for more reasons than one.

(Viewgraph 76)

When the computer broke, everyone was glad for more reasons than one.

(Viewgraph 77)

Original:

He analyzed the data in the afternoon for two hours.

Rewrite:

He analyzed the data for two hours in the afternoon. (Duration precedes a particular moment in time.)

Punctuation is a wide topic. It could easily be, all on its own, the focus of a workshop. However, for International English, we shall restrict our discussion to some issues regarding commas.

(Viewgraph 78)

20. Use a comma between independent clauses.

(Viewgraph 79)

The method introduces additional technical problems, but it presents a viable alternative for oil shale development.

(Viewgraph 80)

21. Use a comma to set off nonrestrictive elements or introductory elements in a sentence.

(Viewgraph 81)

Original:

Two material combinations were selected on the basis of results from these experiments for the extended-operation test as heat pipes.

(Viewgraph 82)

Rewrite:

On the basis of results from these experiments, we selected two material combinations for use in heat pipes designed for the extended-operation test.

(Viewgraph 83)

22. Use the serial comma in lists.

(Viewgraph 84)

The laboratory develops technologies in space vehicles, infrared surveillance, electric power systems, and super-high-speed computers.

Exercise 1

Rewrite the following paragraph in International English by using the guidelines suggested in this talk.

We propose to conduct training in two components. The first component will consist of the writing of a users manual to instruct the novice user on the proper means to use the integrated GUI that has been developed. We do not envision that this users manual will include information on the full suite of functionality of the GIS. Rather it will include the kind of information a user would need to decide whether an application of right-of-way should be granted or rejected. The second component of the training will be the on-site use of the GUI/GIS by personnel.

Definition of Initials

GIS = geographics information system
GUI = graphical user interface

Exercise 2

Rewrite the following passage in International English by using the guidelines suggested in this talk.

One device that is of great value is a booth which personnel exiting a contaminated area pass through. Airflow around the person of a few meters a second is sufficient to transport the ions to a detector and allow a complete monitoring in a few seconds. This can be done automatically and can allow the exit portal to be manned at a much lower level with much better detection than now possible.

REWRITE (for Exercise 1)

(Viewgraph 85)

To help clients understand the graphical user interface

(GUI) and the geographics information system (GIS), we will

(1) write a users manual and

(2) train personnel on site.

The manual will explain the integrated GUI to the novice

user. However, it will not include complete information on

the numerous functions of the GIS. Instead, it will include

the information that a user needs to decide whether to

reject or grant an application for right-of-way.

REWRITE (for Exercise 2)

(Viewgraph 86)

A booth through which personnel exit from a contaminated area is an invaluable monitoring instrument for this project. Airflows of a few meters per second are sufficient to transport the ions to a detector and thus allow, in seconds, complete monitoring of the person passing through. For detection efficiency, we can automate the monitoring process.